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RESPONSES TO COMMENTS FROM THE OHIO EPA ON THE PHASE I WORK PLAN FOR THE OPERABLE UNIT 4 PILOT PLANT

06/01/94

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RESPONSES

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Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705

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JUN 01 1994
DOE-1837-94

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Mr. James A. Saric, Remedial Project Manager
U. S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Schneider:

RESPONSES TO COMMENTS FROM THE OHIO ENVIRONMENTAL PROTECTION AGENCY ON THE PHASE I WORK PLAN FOR THE OPERABLE UNIT 4 PILOT PLANT

In response to the memorandum received by the Department of Energy, Fernald Field Office (DOE-FN) on May 11, 1994, enclosed for your review are responses to the comments on the Operable Unit 4 Pilot Plant Phase I Work Plan. As with the responses previously transmitted to the United States Environmental Protection Agency (USEPA) on the Phase I Work Plan, the response contains references to where the requested information could be found in the Phase II Work Plan. Rather than revise the Phase I Work Plan, DOE-FN is intending to incorporate all Phase I and Phase II Work Plan comments into the Phase II Plan, which requires USEPA approval.

If you have any additional comments on the Phase I Plan or the enclosed comment responses, please contact Randi Allen at 513-648-3102 or bring them to the attention of DOE-FN at the previously schedule June 14, 1994, Pilot Plant meeting.

Sincerely,

for Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Allen

Attachment: As Stated

OHIO EPA COMMENTS
ON
OPERABLE UNIT 4 PILOT PLANT PHASE I

1. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.4.2 Page #: 1-9 Line #: Code: C
Original Comment #:
Comment: The text states "essentially all of the radon initially present in the sample is released during vitrification." Please provide detailed information regarding the capture and control of radon and other contaminants in the off-gas stream.

Response: The Phase II Treatability Study Work Plan further explains radon and off-gas control in Sections 3.2.7, 4.1.2 and 10.3. Table 6-1, Pages 6-6 and 6-7, identifies sampling and analysis for the off-gas system.

Action: None.

2. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.2 Page #: 1-3 Line #: Code: C
Original Comment #:
Comment: Radon, according to the FEMP, is known to be emanating from the silos through cracks and at structural joints of Silos 1 and 2. If the structural integrity allows for the escape of radon, what will the FEMP do to control any potential liquid leakage during the vitrification process if the water pressure method of extraction is used?

Response: Because concrete is not impermeable, radon gas permeates through the concrete. Also, the radon seeps through minute cracks in the concrete. The water jets from the hydraulic mining process is directed downward and radially at the K-65 material. Since the K-65 residues are already saturated, hydraulic mining of the material will not significantly increase the hydraulic head (loading) on the silo walls. Asphalt and gunite have also been applied to the silo walls as a sealant. Therefore, additional liquid leakage through the walls during extraction is not anticipated. Residuals at the wall are anticipated, and alternative (robotics) methods are contemplated for the removal of residual K-65 and all trash objects that may be found during final remediation.

Action: None.

3. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.3 Page #: 2-4 Line #: Code: C
Original Comment #:
Comment: One of the alternatives described in the document allows for the removal of the silo material using water pressure and a slurry pump. Another alternative describes removal by utilizing a vacuum and cutter-head device. It is unclear whether one or both of these methods are being considered. Provide an explanation of the difference between these two methods, including the advantages and disadvantages of both, and which method(s) will be used.

Response: Both methods will be used during Phase II to retrieve waste material from the silos. The water jet method uses water under pressure and a slurry pump to retrieve the K-65 Silo material. The vacuum removal method is for Silo 3 material, since the material is in a dry calcined state.

The Phase II Treatability Study Work Plan further explains these methods in Sections 3.2 and 4.1.1.

Action: None.

4. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.2.5 Page #: 3-2 Line #: Code: C
Original Comment #:
Comment: The FEMP needs to provide more detailed information regarding the vitrification equipment. The data supplied in this document is too vague.

Response: The Phase II Treatability Study Work Plan further explains the vitrification equipment in Sections 4.1.1, 4.1.2 and 4.4.1. A process flow diagram (Figure 4-2) is provided in both Phase I and Phase II Work Plans which illustrate the process flow and all supportive equipment by name.

Action: None.

5. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Page #: 4-3 Line #: Code: C
Original Comment #:
Comment: The Silo 4 superstructure diagram is difficult to read and understand. Please provide either a more simplified and/or larger diagram.

Response: A legible copy of the Silo 4 superstructure diagram will be provided.

Action: A diagram will be included with these comment responses.

6. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.1.1 Page #: 4-6 Line #: Code: C
Original Comment #:
Comment: The text states that "off-gas control will be demonstrated via a glove-bag type barrier." Please describe a glove-bag type barrier and how this will be utilized.

Response: A glove bag procedure consists of the following steps:

a. Place the items that are to be deployed through the manway into a glove bag.
b. Seal the glove bag to manway riser.
c. Remove the manway cover and set aside in the bag.
d. Deploy items.
e. After operation, remove items and set in the bag.
f. Replace the manway cover.
g. Allow radon in the bag to decay to safe levels.
h. Remove the bag from the manway.

This procedure is identical to the one that was successfully used for silo content sampling, for Removal Action No. 4, and for surveillance camera installation.

Action: None.

7. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.1.2 Page #: 4-7 Line #: Code: C
Original Comment #:
Comment: The information in the document regarding the components of the off-gas system is inadequate. Please provide more detailed information on the operation of the off-gas system. Also include a diagram or schematic drawing showing the components and their location within the system.

Response: Refer to the Phase I Work Plan, Page 4-9. The off-gas system doesn't support Phase I operations. The Phase II Work Plan provides more detail in Sections 3.2.7 and 4.1.1. The Process Flow Diagram on Page 4-3 (Fig. 4-2) shows the off-gas system.

Action: None.

8. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.1.2 Page #: 4-7 Line #: Code: C
Original Comment #:
Comment: How similar are the surrogate materials that will be used in the pilot study to the actual materials that will be vitrified in the melter? Will any of the different constituents in the other silos cause the vitrification process to vary?

Response: Physical characteristics of the surrogate material to those of the K-65 waste are very similar; the bentonite clay is identical. Hazardous chemical constituents (non-radioactive) that exist in K-65 wastes will not be introduced into Silo 4, to support the waste minimization philosophy. However, hazardous constituents will be added directly to the slurry tanks feeding the vitrification furnace. It was concluded from the treatability studies performed by Battelle, that the variability observed within the K-65/Bentogrout mixtures does not appear to be great enough to have adverse impact on the glass product. Section 1.4.3 of the Phase II Work Plan explains this in further detail.

Action: None.

9. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 6.1 Page #: 6-1 Line #: Code: C
Original Comment #:
Comment: Please describe the level of soil remediation that will be performed at the vitrification site. There exists the potential for a release during the vitrification process, therefore, remediation may again be necessary after the project is completed. DOE should provide a justification for the levels of contamination to be remediated.

Response: The text on Page 6-1 does not state nor imply soil remediation activities within the work plan. Prior to construction of the Pilot Plant vitrification facility, soil samples in the building footprint were taken, analyzed, and Material Evaluation Forms were issued for the samples. All soils generated from the project will be managed in accordance with the requirements of Removal Action 17 and SSOP-0044, Management of Soil, Debris, and Waste From a Project Rev. 1, 01/31/94.

Action: None.

10. Commenting Organization: Ohio-EPA Commentor: OFFO
Section #: 10.3 Page #: 10-3 Line #: Code: C
Original Comment #:
Comment: Dumpsters will be used to collect scrap for disposal at a sanitary landfill. List where the scrap will be generated and what will be and will not be contaminated. Please provide information describing how it will be determined if the material to be disposed is non-radioactive and/or non-hazardous.

Response: This section refers to construction wastes. Dumpsters will be available for all "clean" construction waste. The waste will be monitored by technicians to guarantee the absence of contamination. The Pilot Plant footprint has been evaluated and designated as clean, which will minimize the chance of contamination reaching the sanitary landfill.

Action: None.

11. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 16.4 Page #: 16-5 Line #: Code: C
Original Comment #:
Comment: The document states that emissions from the vitrification facility shall be vented through a vitrification off-gas system. Provide more detailed information on the off-gas system. In addition, further describe the stack monitoring system to be used. The information given in the text is not detailed enough to determine the effectiveness of the proposed equipment.

Response: See Comment and Comment Response Number 7. The monitoring equipment for Phase II operations will consist of an isokinetic sampler and radon monitoring instrumentation. Table 6-1, Pages 6-6 and 6-7 of the Phase II Work Plan, identifies the sampling and analysis requirements for the off-gas system.

Action: None.

12. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.2 Page #: 1-3 Line #: Code: C
Original Comment #:
Comment: Since Silo 4 has not been used, how is the FEMP assuring the safety and structural integrity of the silo during the cold run when Bentogrout and water are introduced into the silo? If the silo has remained empty for several years, the structure may not be able to withstand the pressure of the material.

Response: Silo 4 is identical to Silos 1, 2, and 3 and was designed to contain a full hydraulic loading. The Phase I operation will not load the silos to its design capacity. Based on

two recently completed structural integrity reports, Silo 4 is structurally sound The two reports are: 1) Silos 1 through 4 Structural Integrity Determination, February 1994, and 2) Structural Evaluation of Silos 1, 2, 3 and 4 with a 6-Foot Diameter Opening at Center Based on 1986 NDT Results, September 1993.

Action: None.

13. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: General Comment Page #: Line #: Code:
Original Comment #:

Comment: This pilot project should be used to develop reductions for air and water usage. A closed-loop system should be considered for water usage in the material removal and slurry process as well as recirculation of the off-gas resulting from the vitrification process.

Response: Please refer to Figure 4-2, Item 4, which is the recycle water tank. This tank will be used to support not only the hydraulic mining pump but other Pilot Plant components and processes. Approximately 90% of the water used for the hydraulic mining system will be recycled.

The off-gas system has been designed as an open system and at an operating efficiency of 97 percent for radon adsorption. A closed loop off-gas system cannot be used since reintroducing the off-gas into the silos during Phase II creates a positive pressure in the silos, which may increase migration of radon gas from the silos. Since other points in the process are also under negative pressure, reintroduction of gas into the process subverts the design. Therefore, the treated off-gas is discharged into the atmosphere.

Action: None.

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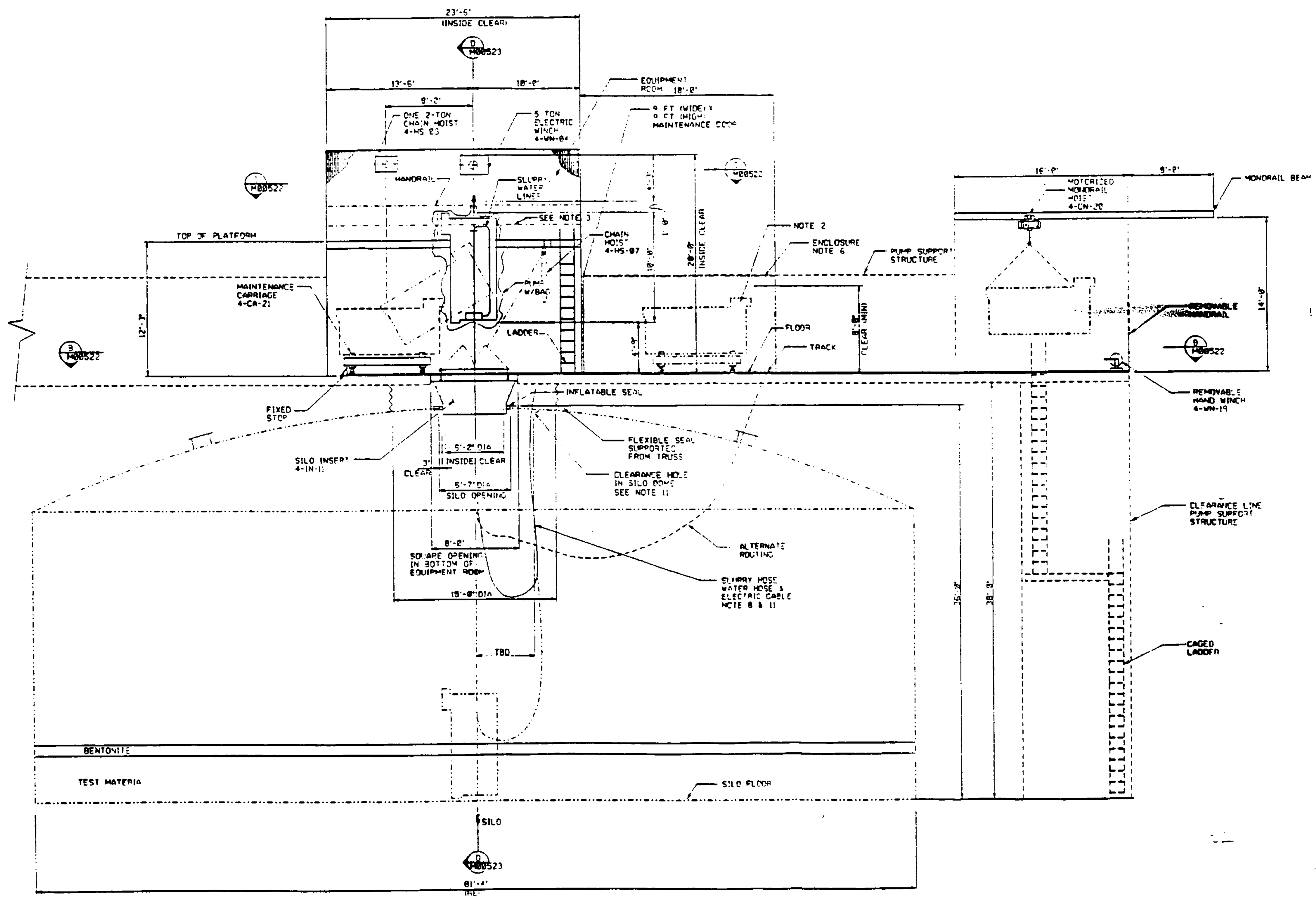
NOTES

1. FOR DRAWING INDEX SEE DRAWING 94X-5900-X-00353.
2. A PORTABLE HAND OPERATED WINCH MAY BE USED TO PULL MAINTENANCE CARRIAGE (WITH PUMP) OUT OF THE EQUIPMENT ROOM. MOTORIZED MONORAIL HOISTS WILL BE USED TO LIFT THE PUMP FROM THE CARRIAGE FOR TRANSFER TO THE CENTRAL MAINTENANCE FACILITY.
3. THE SLURRY PUMP WILL BE REMOVED FROM THE SILO ONLY FOR MAINTENANCE. THE PUMP WILL BE "BAGGED" AS SHOWN AND PLACED ON THE MAINTENANCE CARRIAGE BEFORE BEING TAKEN OUT OF THE EQUIPMENT ROOM.
4. THE SILO DOME CUTTING (5'-7" DIA) EQUIPMENT WILL BE LOCATED INSIDE THE EQUIPMENT ROOM AND THE EQUIPMENT ROOM "SEALED" TIGHT TO ENSURE DIRECTIONAL AIR FLOW TOWARDS THE SILO DURING DOME REMOVAL OPERATIONS.
5. THE BENTONITE CAP MAY HAVE TO BE "PUNCTURED" BY HIGH-PRESSURE WATER JETTING EQUIPMENT IF THE SINK JETS. (INTEGRAL WITH SLURRY PUMP) ARE NOT EFFECTIVE IN BREAKING THROUGH THE CAP.
6. A TEMPORARY ENCLOSURE WILL BE REQUIRED DURING REMOVAL OF PUMP FROM EQUIPMENT ROOM TO SIMULATE "HOT OPERATIONS" OVER SILOS 1 AND 2. HEAVY PLASTIC WILL BE TAPED TO STRUCTURAL FRAME DURING THE PUMP REMOVAL OPERATION.
7. DIMENSIONS MAY CHANGE DURING TITLE II DESIGN.
8. HOSES TO BE CONNECTED AT PIPE RACK AT A LOCATION TO BE DETERMINED DURING TITLE II DESIGN.
9. THIS DESIGN IS STRICTLY FOR TECHNOLOGY DEMONSTRATION ON SILO 4 ONLY, ASSUMING "HOT" CONDITIONS THAT ARE EXPECTED TO OCCUR DURING REMEDIAL ACTION.
10. THE CLEARANCE ENVELOPE, AS GIVEN BY FERMCO FOR PUMP CLEARANCE, IS 6 FOOT DIAMETER AND 10 FEET HIGH WITH A PUMP WEIGHT OF 5520 POUNDS.
11. SLURRY HOSE, WATER HOSE & ELECTRIC CABLES WILL PASS THROUGH AN OPENING IN THE SILO DOME. THE LOCATION OF THE OPENING SHALL BE DETERMINED DURING TITLE II DESIGN. IF STRUCTURAL ANALYSIS OF THE DOME INDICATES THIS IS NOT POSSIBLE, THE HOSES, ETC., WILL PASS THROUGH AN EXISTING MANHOLE AS SHOWN IN THE ALTERNATE ROUTING.



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REF DWG NO.	DRAWING TITLE
94X-5900-M-00522	GENERAL ARRANGEMENT - PLAN
94X-5900-M-00523	GENERAL ARRANGEMENT - SECTION
94X-5900-X-00353	DRAWING INDEX SHEET 1 OF 4

REV NO	ISSUE OR REVISION PURPOSE - DESCRIPTION	INITIALS AND DATE
0	APPROVED FOR CONSTRUCTION	

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
PARSONS
THE RALPH M. PARSONS CO. - PARSONS MAIN, INC. - ENGINEERING-SCIENCE, INC.
CINCINNATI, OHIO

PROJECT NAME: SILO 4 WASTE REMOVAL & TRANSPORTING SYS CRU4

DRAWING TITLE: MATERIAL HANDLING GENERAL ARRANGEMENT - ELEVATION HYDRAULIC SLURRY WASTE REMOVAL

DRAWN BY: NM TERRY, DATE 10-1-93; CHECKED BY: K. TULI, DATE 10-22-93
SCALE: 1/4" = 1'-0"

CRU4/P092 | WBS 1.1.1.1.4.3.1 00-90701 | 94X-5900-M-00521 | M0001 | 0

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